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INJURY TO THE CAUDA EQUINA, PROBABLY DUE TO INTRA-MENINGEAL HEMOR- RHAGE; WITH RECOVERY.¹

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S. L. R., forty-one years old, is an American, married, and by occupation a grocer. His father and mother are living and in good health. The patient has been in perfect health since childhood, and, with the exception of gonorrhea, has had no venereal disease. He has of late drunk whiskey and other alcoholic liquors quite freely. On April 16, 1891, while under the influence of alcohol, he was thrown from an electric car, striking on the lowermost part of the spine; the patient places his hand over the region of the sacrum as the seat of pain and injury. He was found in an unconscious condition, and was then taken home. On the way he regained consciousness, and it was then discovered that he was totally paralyzed as to motion in his lower extremities, not being able to flex or extend his toes. On the following day it was discovered that there was a total "paralytic incontinence." The bladder was carefully emptied by the catheter, the introduction of which was entirely unrecognized by the patient, showing anesthesia of the mucous membrane of urethra. The feces, when semi-solid or liquid, would pass uncontrolled, but if they

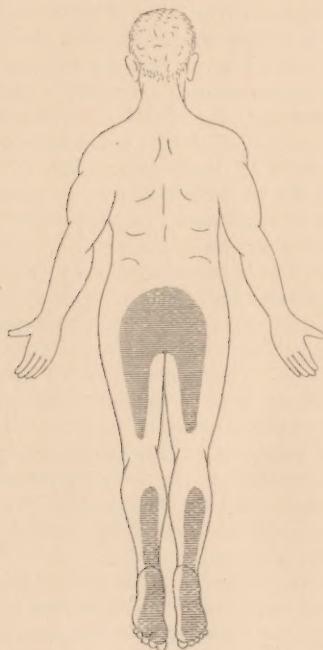
¹ Read by title at New York State Medical Society Meeting, 1894.



were very hard mechanical measures were necessary to remove them. On several occasions, when feces became impacted, the mechanical manipulation necessary to remove them excited no pain, and he had but little knowledge of what was going on in the rectum. He complained bitterly of pain over the sacral region, of a sharp, shooting character, and greatly aggravated by movement; the pain was at times of an agonizing character, and was mostly localized over the sacrum, but would occasionally pass down the distribution of the great sciatic nerves. The urine was carefully withdrawn at stated intervals. In May the man had recurring chills and high fever, with marked changes in the urine; this was ammoniacal, contained pus and bladder-epithelium, proofs of a "retention-cystitis." This state of affairs was soon corrected by salol and thorough irrigation with a boric-acid solution.

My first acquaintance with the case was on May 1, 1891, when I saw the patient in consultation with my friend Dr. John Morris, of Troy, who had been his medical attendant. I found him recumbent and unable to move his lower extremities; there remained slight power of abduction; adduction was entirely lost; the paralysis of motion was most marked from the knees down. There was a characteristic foot-drop, and he was unable to move the toes or to flex or extend the feet. There was marked atrophy of the peronei muscles, the anterior and posterior tibials, and the muscles of the calf, with considerable wasting of the vasti and of the gluteus maximus. The paralysis and atrophy were much more noticeable throughout the whole right side. By actual measurement a difference of three-quarters of an inch was discovered, the smaller circumference being on the right side; the limbs were flaccid, somewhat swollen, cold, and cyanotic. The patella, plantar, and cremasteric reflexes were absent on both sides, and there was no foot-clonus. The umbilical reflex was present. The

sphincter ani was relaxed, and offered no resistance to the introduction of the finger. There appeared to be a decided blunting of sensibility of the rectal mucous surfaces, because when the finger was in the rectum con-



The transverse lines represent the areas of complete anesthesia.

siderable pressure with the nail was not followed by pain. There was no response to the faradic current in all of the atrophied muscles, namely, the gluteus maximus, vasti, peronei, the tibial, and the calf muscles. There were slow, worm-like contractions of these muscles in

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closing the current with the positive pole ; there was no response to the negative pole, forty cells being in the circuit—in other words, there was decided degenerative reaction. The sexual power was entirely lost, and the man had had no erections since the accident. A sensory loss of peculiar distribution was discovered ; this loss can best be explained by the diagram shown herewith, namely, an entire loss of the tactile, pain, and temperature senses over an area extending about two inches to either side of the tuber ischii, involving the region of skin between the gluteal fold ; this loss involved particularly the skin of the perineum, that of most of the scrotum, and the skin of the penis to near its root. A narrow patch of anesthesia extended down the posterior aspect of the thighs, and involved also the soles, and extended up the posterior aspect of the legs. Over the anesthetic area there was no perception of strong electric currents. Bedsores never developed, which I think may have been due to the extreme care on the part of his nurse. There have been no feelings of constriction about the legs or thighs. The catheter could be introduced when the patient was blindfolded without eliciting any response or knowledge of its presence. Careful examination of the lower lumbar and sacral regions showed nothing abnormal. There were no abnormal symptoms as regards the cranial nerves, and the upper extremities were normal.

The treatment consisted of moderate doses of potassium iodid, with *tr. nucis vomicæ* thrice daily, and three electric treatments weekly. At the expiration of five weeks the following indications of improvement were noted: The man was able to adduct, abduct, flex, and extend the left thigh. Two weeks later he began to be able to contract the left calf-muscles, and ten days afterward he was able to flex the foot on the leg, but there was absolutely no motion of the toes, nor could he raise that member from the bed. Ten weeks after the accident he

could extend and flex the thigh of the right side, and there was at same time slight evidence of ability to contract the calf-muscles. Three months after the accident he could move the toes of the left foot, and was able to lift that member from the bed. At about the same time there was an ability to flex, extend, and separate the toes of the right foot. Fourteen weeks after the injury he could raise the right leg from bed and sustain it in that position for some time. At this time a careful examination was again made. The muscles that were decidedly atrophied were regaining their size, losing their flabby appearance, and responding sluggishly to strong faradic currents. The reflexes remained as at first. The anesthetic areas were becoming sensitive at the periphery. The condition of the skin of the perineum, scrotum, and penis was not at all improved. The catheter excited no pain or feelings of its presence. The rectal sphincter had slightly recovered its tone. The only change in treatment was the substitution of increasing doses of strychnin and the addition of massage.

Five months after the injury there was a decided improvement, the patient being able to walk with the aid of crutches, and could stand alone, and the patellar reflexes were present. The patient felt the introduction of the catheter, although not in a normal manner. During the past two weeks he had had two nocturnal emissions. He knows when the rectum is full, but has no power over the sphincter muscles. There was a gradual fading away of the anesthetic zones. The atrophied muscles responded to negative closing with forty cells, and to strong faradic currents. On October 1, 1891, the man walked from his home to my office, a distance of about one mile, with but slight fatigue. There was a slight shuffling gait, and the toes "stuck to the floor." There was an entire return of sensation, save over the perineum and the inferior part of the scrotum. He felt perfectly the introduction of the cath-

eter, and was able to control the bladder and urinate at will. The rectal sphincter had regained very much its tone, although it offered no great resistance to the finger, and he still resorted to enemata to evacuate the rectum. Sexual power was perfect.

The interesting clinical features of this case, and those upon which one may be almost positive in making a correct diagnosis of the nature and location of the lesions, seem to be as follows: Most noteworthy was the peculiar sensory loss, being in the anatomic distribution of the lesser sciatic, the pudic, inferior pudendal, and hemorrhoidal nerves, all arising from the lower sacral plexus. Secondly, the early involvement of the sphincters of the bladder and rectum, and the very late disappearance of their paralysis, arising, as they probably do, from the third, fourth, and fifth sacral segments, and being supplied by the fourth sacral nerve. Thirdly, the distribution of the muscles most affected and last to recover, namely, the anterior and posterior tibials, those of the calf and the intrinsic muscles of the feet, with the gluteus maximus, receiving their nerve-supply, with the exception of the gluteus maximus, almost entirely from branches of the great sciatic nerve; with a more moderate involvement, a lesser degree of atrophy, and a rapid improvement of the extensor quadriceps and the adductors of the thigh. Lastly, the absence of any external evidence of fracture or dislocation. All of the symptoms point to an intra-meningeal hemorrhage, compressing the leash of nerves that go to form the cauda equina, exciting inflammation in those nerves, with, as absorption took place, a release of the pressure and a rapid recovery.